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(पहला पुनरीक्षण)

Pneumatic Tyred Roller — Specification

(First Revision)

ICS 91.220

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भारतीय मानक ब्यूरो
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Construction Plant and Machinery, Sectional Committee, MED 18

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Mechanical Engineering Divisional Council (MEDC).

This Indian standard was first published on 02 December 1969. This standard is being revised to accommodate latest industrial practices and technical advancements in the country.

Pneumatic Tyred Rollers (PTR) are self-propelled and are mainly employed for the compaction of asphalt surfacing, shallow lift sub grade, gravel and stabilized base, hot mix and cold mix surfaces and seal or armor coating. For fine grained cohesive soils, they give good performance when the soil has the moisture content about 2 to 4 percent below the plastic limit.

The composition of the Committee, responsible for the formulation of this standard is given at Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PNEUMATIC TYRED ROLLER — SPECIFICATION

(First Revision)

1 SCOPE

This standard lays down the requirements for material, size, design, construction and performance of the pneumatic tyred rollers.

2 REFERENCES

The standards listed in Annex A contain provisions, which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply:

Pneumatic Tyred Roller — A roller with hollow open topped box body mounted on a number of low pressure pneumatic tyred wheels, the number of wheels varying from 7 to 9. The wheels are mounted in two lateral rows, one under the front and one under the rear end of the body with rear row having one wheel more than those in the front or equal no in the front. The front wheels are staggered to cover the gaps in the rear row so that the whole width of the ground traversed by the roller is covered by wheel treads. The wheels are mounted in pairs with the exception of the centre wheel of the rear row and front pair of wheels is on its own single axle which is pivoted at its centre and arranged in such a manner that the wheels can oscillate to accommodate themselves to the unevenness of the ground.

NOTE — The rocking or wobbling motion, resulting from this type of suspension, kneads the soil and under most conditions produces a smooth compacted surface.

4 DESIGNATION OF SIZES

The size of a wobble wheeled pneumatic tyred roller shall be designated by the weight of the roller fully ballasted to its maximum capacity. The size of the pneumatic tyred roller shall be designated by the number of units (that is the number of wheels) and the capacity of each unit in litres.

5 SIZES

Pneumatic tyred rollers shall be of the size of maximum 27 tonnes.

6 MATERIALS

Materials specified in Annex A are for general guidance only.

7 CONSTRUCTION

7.1 The construction of the pneumatic tyred roller in general shall be strong, robust and capable of withstanding continuous strain likely to be imposed during operation over soft ground at speed up to 8 km/h and on hard grounds at speed up to 40 km/h.

7.2 The main frame of the roller shall be made of structural steel with deep section rolled steel channels or other sections welded, cross braced and stayed to form a rigid unit to ensure perfect alignment and transmission throughout the life of the roller.

7.2.1 The frame for pneumatic tyre roller shall carry the front axles and the draw bar, and shall pivot freely from the underside of the body.

7.3 All parts of the roller requiring frequent replacement or constant attention or periodic servicing shall be easily accessible with minimum dismantling of fittings or parts.

7.4 The parts, which are exposed to atmosphere and are liable to become defective due to dust, shall be covered.

8 BALLASTING

Body of the roller shall be so designed that it shall carry ballast of any sort (such as sand, stone, iron, etc.) available at site in order to increase the weight of the rollers.

9 WEIGHT DISTRIBUTION

Both front and the rear wheels shall be loaded suitably by putting ballasts.

10 WHEELS

10.1 In pneumatic tyred roller, front and rear wheel combination shall be as following:

a) 3 × 4;
b) 4 × 4; or
c) 4 × 5.

10.2 Plain tyres without treads with four ply or above rating of suitable size to withstand the fully ballasted weight of the roller shall be provided. Tyres pressure shall be as specified in Table 1.

NOTE — The performance of a pneumatic tyred roller depends on the tyre inflation pressure and the area of contact between the tyres and the ground. The actual used pressure will depend on the amount of ballast carried and the degree of compaction required. In order to get even compaction and a smooth finish, care should be taken to see that all tyres are inflated to the same pressure.

Table 1 Tyres Pressure

(*Clause* 10.2)

Sl No.	Wheel Load (kg)	Inflation Pressure (kPa)						
		240	350	480	620	720	830	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
i)	1 125	2.0	2.4	2.7	3.0	3.3	3.4	GCP
ii)	1 375	2.2	2.6	3.0	3.3	3.5	3.8	GCP
iii)	1 825	2.4	2.8	3.4	3.8	4.0	4.3	GCP
iv)	2 250	2.5	3.1	3.6	4.1	4.4	4.8	GCP
v)	2 750	2.6	3.2	3.9	4.4	4.8	5.2	GCP
vi)	3 000	2.7	3.3	4.1	4.6	4.9	5.4	GCP

*GCP : Ground Contact Pressure(kg/cm^2)

10.3 Largest capacity wheel bearings to accommodate the thrust of maximum ballasted load shall be provided.

11 ENVIRONMENTAL CONDITIONS

11.1 The roller shall operate satisfactorily without damage to any components when working under the following atmospheric conditions:

a) *Temperature* — Any temperature between – 10 °C and 60 °C; and
b) *Humidity* — 100 percent relative humidity at any temperature up to 27 °C ± 2 °C ambient.

The roller shall not suffer any damage to any component if kept idle under the above-mentioned atmospheric conditions.

11.2 Gradient rollers of all sizes shall be capable of operating on gradient of 1 in 6 (17 percent).

12 TURNING CIRCLE RADIUS

The roller shall be capable of being operated within the minimum outside turning circle radius as per IS 12222.

13 WATER SPRINKLING

13.1 Water sprinkling system shall be provided for all wheels with controller.

13.2 Water tank having adequate capacity shall be provided to feed the sprinklers for at least four hours.

13.3 Tank shall be made of heavy gauge steel and painted with anti-corrosive paint or of non-corrosive polymer material.

14 ACCESSORIES

14.1 Individual flexible tine/nylon/coir scrapper shall be provided on all wheels.

14.2 If so desired by the purchaser, lights shall be provided at the front and the rear end of the roller to operate it during night.

14.3 Suitable awning shall be provided to protect the operator from sunny, cold and rainy weather.

15 LIFTING AND TOWING ARRANGEMENT

15.1 The roller shall be provided with suitable means for towing.

15.2 The roller shall be fitted with suitable means for lifting by slings and crane.

16 LUBRICATION

Adequate lubrication of all moving parts shall be provided keeping the maintenance schedule as simple as possible.

17 SAFETY REQUIREMENTS

17.1 Safety guards for moving parts shall be provided.

17.2 The roller shall be provided with suitable means to show presence of the roller during night time for other vehicles.

18 TOOLS AND INSTRUCTION MANUALS

A strong tool box with lock and key containing the necessary tools for normal running adjustments and lubrication together with instruction manual and an inventory of the tools shall be provided and fixed to the roller.

19 MARKING

19.1 Rating Plate

Each roller shall have a rating plate firmly attached to some part which shall not be easily removable. The plate shall have clearly marked on it the following information.

a) Manufacturer’s name and address;
b) Product identification number (PIN);
c) Model/type;
d) Engine power;
e) Machine mass; and
f) Month and year of manufacturing.

19.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
2062 : 2011	Hot rolled medium and high tensile structural steel
1079 : 2017	Hot rolled carbon steel sheet plate and strips specification
2707 : 1996	Carbon steel castings for surface hardenings
2004 : 1991	Carbon steel forgings for general engineering
210 : 2009	Gray iron castings
1148 : 2009	Steel river bars (medium and high tensile) for structural purpose
4454 (Part 1) : 2001	Steel wire for mechanical springs: Part 1 Cold drawn unalloyed steel wire
4454 (Part 2) : 2001	Steel wire for mechanical springs: Part 2 Oil hardened and tempered steel wire
4454 (Part 4) : 2001	Steel wire for mechanical springs: Part 4 Stainless steel wire
12222 : 2011	Automotive vehicles turning circle and maneuverability requirements

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Construction Plant and Machinery Sectional Committee, MED 18

Organization	*Representative(s)*
Directorate General of Quality Assurance, Ministry of Defence, New Delhi	Brig P. K. Shrivastava (***Chairman***)
AIMIL Limited, New Delhi	Shri Rohitash Barua Shri K. K. V. Yasas (*Alternate*)
Airports Authority of India, New Delhi	Shri G. K. Choudhary Shri R. L. Sharma (*Alternate*)
Ammann Apollo India Private Limited, Gujrat	Shri Girish Dixit Shri Ashish Patel (*Alternate* I) Shri Manan Rajpura (*Alternate* II) Shri Prasad Dayal (*Alternate* III)
Atlas Copco India Limited, Pune	Shri Vijay Sharma Shri Yogesh Tuljapurkar (*Alternate*)
B G Shirke Construction Technology Limited, Pune	Shri A. D. Bhosale Shri Sunil Kedar (*Alternate*)
CSIR-Central Building Research Institute, Roorkee	Dr Suvir Singh Shri Rajiv Goel (*Alternate*)
Caterpillar India Private Limited, Chennai	Shri K. Reji Jose Shri Ramesh Vishwanathan (*Alternate*)
Central Water Commission, New Delhi	Shri Atul Jain Shri A. S. Goel (*Alternate*)
Chief Quality Assurance Establishment, Ministry of Defence, New Delhi	Col Suresh K. Lt Col A. K. Maurya (*Alternate*)
Directorate General Border Roads, New Delhi	Shri P. R. Ray Col Manjunath BT (*Alternate*)
Escorts Construction Equipment Limited, Faridabad	Shri Faiz Ahmad Shri Ashok Chauhan (*Alternate* I) Shri Laxmi Chand Tyagi (*Alternate* II)
IRCON International Limited, New Delhi	Shri Randhir Gupta Shri S. K. Ray (*Alternate*)
Indian Construction Equipment Manufacturers Association, New Delhi	Shri K. V. Krishnamurthy
Jaypee India Limited, Kolkata	Shri Kumar M. Mehta Shri Kumar M. Mehta (*Alternate*)
John Deere India Private Limited, Mumbai	Shri Karthik Kaliappan Shri Raj Anand (*Alternate*)
KYB Conmat Private Limited, Sahibabad	Shri Nagesh Kudva Shri Kalpesh Soni (*Alternate*)
Larsen and Toubro Limited, Bengaluru	Shri K. Keshava Shri M. Suresh Kumar (*Alternate*)
Ministry of Road Transport and Highways, New Delhi	Shri K. C. Sharma Shri Rohit Singh (*Alternate*)

Organization	*Representative(s)*
National Council for Cement and Building Materials, Faridabad	Shri Kapil Kukreja Shri Saurabh Bhatnagar (*Alternate*)
Shapoorji Pallonji And Company Private Limited, Mumbai	Shri Neeraj Kapoor
Universal Construction Machinery and Equipments Limited, Pune	Shri Ranjeet More Shri Ravi Chavan (*Alternate*)
Volvo Construction Equipments India Private Limited, Bengaluru	Shri V. R. Sai Prasad Polipalli Shri K. Raghuraman (*Alternate*)
Wirtgen India Private Limited, Pune	Shri Deepak Bhoir Shri Parul Arora (*Alternate*)
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In Personal Capacity (*D-24, Amar Colony , New Delhi*)	Shri Satander Kumar
BIS Directorate General	Shri Rajneesh Khosla, Scientist 'E' and Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Lokraj Meena
Scientist 'B' (MED), BIS

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